

REMARKS

In view of the above amendments and the following remarks, reconsideration and further examination are respectfully requested.

I. Claim Amendments

Claims 1 has been amended to clarify features of the invention recited therein and to further distinguish the present invention from the references relied upon in the rejections discussed below.

Support for the above mentioned amendments can be found, at least, in lines 6 and 7 on page 17 of the originally filed specification.

Claims 11 and 12 have been amended to make various editorial revisions thereto. These editorial revisions have been made to place the claims in better U.S. form. Further, these editorial revisions have not been made to narrow the scope of protection of the claims, or to address issues related to patentability, and therefore, these amendments should not be construed as limiting the scope of equivalents of the claimed features offered by the Doctrine of Equivalents.

III. 35 U.S.C. § 103(a) Rejections

Claims 1, 3, 4 and 6-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Yuhas (U.S. 5,464,658), the admitted prior art (see pages 1-4, 8 and 9 of the specification) and MSU (“Composition of Typical Stainless Steels (ATSM A270)”). Further,

claims 2 and 16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over various combinations of Yuhas, the admitted prior art, MSU, Ikeguchi (JP 57011026) and Del (U.S. 4,180,608). These rejections are believed clearly inapplicable to amended independent claim 1 and claims 2-4 and 6-16 that depend therefrom for the following reasons.

Amended independent claim 1 recites a method of manufacturing a multi-layer circuit board including a core circuit board (with a circuit pattern) and a prepreg sheet. Further, claim 1 recites that a thermal expansion coefficient of the core circuit board is in a range of $10 \times 10^{-6}/^{\circ}\text{C}$ to $12 \times 10^{-6}/^{\circ}\text{C}$. Claim 1 also recites that the thermal expansion coefficient of the core circuit and the thermal expansion coefficient of the pair of lamination plates sandwiching the core circuit are equivalent, wherein the thermal expansion coefficient of the pair of lamination plates is smaller than a thermal expansion coefficient of the copper metal foil.

Initially, please note that the present invention solves the problem of the conventional art illustrated in Fig. 8. Specifically, as stated in lines 17-24 on page 9 of the originally filed specification, the problem of the conventional art is that, when a coefficient of linear expansion of a circuit board 30 is $10 \times 10^{-6}/^{\circ}\text{C}$ to $12 \times 10^{-6}/^{\circ}\text{C}$, metal foil sheets 25a and 25b have a coefficient of linear expansion of $18 \times 10^{-6}/^{\circ}\text{C}$ to $12 \times 10^{-6}/^{\circ}\text{C}$ and lamination plates 26a and 26b have approximately the same coefficient of linear expansion as the metal foil sheets 25a and 25b.

The invention of claim 1 solves this problem of the conventional art by selecting a lamination plate having a thermal expansion coefficient that is equivalent to that of the core circuit board, which is in the range of $10 \times 10^{-6}/^{\circ}\text{C}$ to $12 \times 10^{-6}/^{\circ}\text{C}$.

The above-described 35 U.S.C. § 103(a) rejection relies on Yuhas for teaching that thermal expansion coefficient of the lamination plates is equivalent to the thermal expansion coefficient of the core circuit board, as previously recited in claim 1. However, in view of the above-identified amendments to claim 1, which further limit the thermal expansion coefficient of the core circuit board, it is submitted that Yuhas fails to disclose or suggest the above-mentioned distinguishing features now required by amended claim 1.

Rather, Yuhas merely teaches laminates having a thermal expansion coefficient of $17.4/^{\circ}\text{C}$ (see col. 1, lines 60-63 and table IV) and laminates having a thermal expansion coefficient range of $12.5\text{-}21.5/^{\circ}\text{C}$ (see table III).

Thus, in view of the above, it is clear that Yuhas teaches a thermal expansion coefficient range of $12.5\text{-}21.5/^{\circ}\text{C}$, but fails to disclose or suggest that the thermal expansion coefficient of the core circuit board is equivalent to that of the pair of lamination sheets, and the thermal expansion coefficient of the core circuit board is in a range of $10 \times 10^{-6}/^{\circ}\text{C}$ to $12 \times 10^{-6}/^{\circ}\text{C}$, wherein the thermal expansion coefficient of the pair of lamination plates is smaller than a thermal expansion coefficient of the copper metal foil, as recited in claim 1.

In addition, the Applicants note that MSU teaches a thermal expansion coefficient of $17 \times 10^{-6}/^{\circ}\text{C}$, but fails to disclose or suggest that the thermal expansion coefficient of the core circuit board is equivalent to that of the pair of lamination sheets, and the thermal expansion coefficient of the core circuit board is in a range of $10 \times 10^{-6}/^{\circ}\text{C}$ to $12 \times 10^{-6}/^{\circ}\text{C}$, wherein the thermal expansion coefficient of the pair of lamination plates is smaller than a thermal expansion coefficient of the copper metal foil, as recited in claim 1.

Therefore, because of the above-mentioned distinctions it is believed clear that claim 1 and claims 2-4 and 6-16 that depend therefrom would not have been obvious or result from any combination of Yuhas, MSU, and the admitted prior art.

Furthermore, there is no disclosure or suggestion in Yuhas, MSU, and/or the admitted prior art or elsewhere in the prior art of record which would have caused a person of ordinary skill in the art to modify Yuhas, MSU, and/or the admitted prior art to obtain the invention of independent claim 1. Accordingly, it is respectfully submitted that independent claim 1 and claims 2-4 and 6-16 that depend therefrom are clearly allowable over the prior art of record.

Regarding dependent claims 2 and 16, which were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yuhas, MSU and the admitted prior art in view of various combinations of Ikeguchi and Del (secondary references), it is respectfully submitted that these secondary references do not disclose or suggest the above-discussed features of independent claim 1 which are lacking from Yuhas, MSU and the admitted prior art. Therefore, no obvious combination of Yuhas, MSU and the admitted prior art with any of the secondary references would result in, or otherwise render obvious, the invention recited independent claim 1 and claims 2-4 and 6-16 that depend therefrom.

IV. Conclusion

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance and an early notification thereof is earnestly requested. The Examiner is invited to contact the undersigned by telephone to resolve any remaining issues.

Respectfully submitted,

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